

# 1996 CNA/RAND Infrastructure Symposium

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## Background

The Director of Shore Installation Management (N46) sponsored CNA's participation in an Infrastructure Symposium with RAND from October 16 to 18, 1996 at the RAND Santa Monica facility.<sup>1</sup> Both CNA and RAND have a long history of research in defense infrastructure. By working together, they can build upon each other's research and plan future research better than if they work in isolation. In this way, CNA can use the Navy's resources more efficiently.

DoD continues to struggle with how to operate more effectively and fulfill its mission when resources are shrinking. In particular, DoD is looking to create a more efficient infrastructure to make funds available for recapitalization and modernization.

The primary purpose of the symposium was to synthesize the results of previous and ongoing research projects and thereby identify the best areas and approaches for future research. This symposium allowed CNA to compare approaches and findings, gain new perspectives and insights, and leverage off work done elsewhere. This is to the Navy's advantage because it avoids CNA doing duplicative work or "rediscovering" new concepts.

At the conference, we devoted a half day each to the issues of improving internal business practices and to material support and readiness. A full day was devoted to outsourcing topics. Specific topics included the following:

- Improving DBOF—What are the problems and how can they be solved?
- The importance of cost visibility and incentives
- Outsourcing opportunities in the Navy and other services

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1. A similar symposium was held at CNA in June 1994.

- How can the Navy decide what is core? Are there any support functions that can't be outsourced?
- Alternative approaches to housing military personnel
- Identifying opportunities to improve material management
- Better managing readiness and understanding the link between support and readiness.

In this paper, we will discuss each day of the conference in turn, outline common themes, identify promising areas and approaches for future research, and then draw overall conclusions. We also recommend a separate follow-up meeting in the Washington area between CNA and RAND representatives and the important players in DoD and Congress as a good way to leverage the knowledge gained at the symposium into a concrete plan for the Navy and DoD.

This paper represents the views of the CNA participants. RAND participants may have come away with some different views, but we think that would only reflect differences in emphasis. Many of the results reported were preliminary and had not been shown to study sponsors. We therefore avoid detailing the findings.

# Session one: Improving internal business practices

This session focused on the setting of prices for services provided internally. We discussed cost visibility, full budgets that included all the resources used at a facility, and more choices for operational units in where they get support.

There were six briefings on the first day:

- *Pricing Air Force Depot-Level Repairables*, by Laura Baldwin and Glenn Gotz (RAND)
- *How Army Pricing of Repair Services Affects ISM*, by Marygail Brauner and Ellen Pint (RAND)
- *DBOF Viewed From the Perspective of an Internal Market*, by Carl Dahlman (RAND)
- *Improving DBOF*, by Derek Trunkey (CNA)
- *Motivational Metrics for Depot-Level Repair*, by Frank Camm, Lionel Galway, and Hy Shulman (RAND)
- *Cost Visibility Incentives*, by Alan Marcus (CNA)

## Summary of session one

Laura Baldwin and Glenn Gotz examined DLR prices. They noted that surcharges can equal half the price of spares creating a misallocation of resources. The Air Force method for allocating the surcharge across spares resulted in a surcharge that varied from 8 to 70 percent of the total cost for a sample of spares by—which made the situation even worse. They argued for marginal cost pricing with fixed costs being charged separately to major commands. There was some

discussion over whether that creates incentives for suppliers to increase the amount of costs treated as fixed.

Marygail Brauner and Ellen Pint looked at Army pricing of repair services. The prices used in the competition process were different from the actual charges. This resulted in distortions in the choices of repair location.

Carl Dahlman examined DBOF as an internal market. He argued that the focus of DBOF was providing information to senior managers and stabilizing prices for customers rather than trying to create an internal market. He noted that the programming process may be the closest the military comes to a market process. In the programming process, senior leaders allocate scarce resources among alternatives and see the full opportunity costs of their choices.

Derek Trunkey provided a broad overview of the DBOF system. His recommendations were consistent with those in the earlier briefings. He added the issues of stabilized prices and past losses to those previously discussed.

Frank Camm, Lionel Galway, and Hy Shulman focused on creating incentives for managers in a nonmarket setting. They examined the example of a shop repairing F-16 avionics. The idea is to set performance measures for shop managers that make their goals consistent with those of the Air Force, e. g., operational equipment at lowest cost. The measures were limited to those within the control of the shop managers.

Alan Marcus applied some of the principles reviewed in the DBOF discussions to other resource allocation decisions, specifically allocation of military manpower and training resources. He suggested alternatives to make the opportunity costs of decisions about manpower allocation more visible. He also identified ways to create competitive pressures on the providers of services, particularly the training community.

We agreed that the current DBOF system has many problems. Prices are distorted, and the system has not been set up to provide accurate costs. There was some disagreement as to how to correct the system.

Most attendees believe that a reimbursable system (an improved version of DBOF) is best, one with full budgets to customers and alternative suppliers. Several participants noted that the DBOF system played an important informational role, even if it was an imperfect substitute for a market system. For them, changes can and should be made within the current system.

However, some felt that implementing a real pricing system in DoD was hopeless. Even if DBOF prices are set correctly, if other alternatives are direct-funded, customers are unlikely to make the right resource choices. A centrally directed system with good accounting could mimic the decisions from a pricing system. These individuals would be willing to end DBOF for at least some activities.

CNA and RAND have had a somewhat different focus in their research. CNA has tended to evaluate the overall DBOF system and identify flaws in it. RAND has tended to look at specific costs as currently constructed, such as those of Depot-Level Repairables (DLRs), and has identified systematic problems that distorted those specific costs.

For future research, we agreed that the empirical work has not kept up with the theoretical work in this area. Theoretically, we know the impact of internal prices, but we need better empirical documentation of the size of those impacts. We discussed whether pilot projects are needed or whether the system has already generated the data and the data need only be mined. CNA participants noted how in the related area of outsourcing, they retrieved historical aircraft maintenance and readiness data to capture the effect of using contractor maintenance personnel in place of military personnel. We may also have some real data on making depot components reimbursable.

## **Conclusions and implications for future research**

There was general agreement that DoD needs to give DBOF managers more flexibility in managing resources. There are too many restrictions on capital purchases and the use of personnel. Giving the flexibility and the right incentives is better than centrally managing

with so many restrictions. Revising the civil service system should be a high priority.

CNA and RAND should broaden their research beyond the issue of internal pricing. We should be looking at how to move budgets to the customers and allow them to make choices (including buying from outside DoD). In such a system, market prices dominate, and government support activities must conform to those prices. Government activities would have to adopt standard accounting practices that capture economic costs.

Analysts should not treat fixed costs and variable costs as inherently separate. Fixed/variable cost relationships are endogenous. If facilities charge only variable costs and allocate surcharges across all users to cover fixed costs, facilities will have the incentive to shift more of costs to fixed, which will include capital and management.

## Section two: Outsourcing and privatization

The second day was devoted to discussions of outsourcing and privatization research. We heard ten briefings:

- *Best Practices of Commercial Outsourcing and a Strategic Sourcing Process for the Air Force*, by Frank Camm and Nancy Moore (RAND)
- *The Economics of Vertical Integration, with Implications for Outsourcing Decisions*, by Ellen Pint and Laura Baldwin (RAND)
- *Patterns of Outsourcing in the Air Force*, by Ed Keating (RAND)
- *Outsourcing Opportunities in the Navy*, by Carla Tighe (CNA)
- *What is Core?* by Jon Leland (CNA)
- *Are There Service Differences?* by Derek Trunkey (CNA)
- *End-to-End Map of the Contracting Process for Depot-Level Repair of Secondary Items*, by Mary Chenoweth and Ken Reynolds (RAND)
- *A Model for Simulating Complex Contracting Options*, by Ed Keating (RAND)
- *Outsourcing: Impacts on the DoD Civil Service Work Force*, by Al Robert (RAND)
- *Rethinking Navy Housing*, by Glenn Ackerman (CNA)

### Summary of session two

RAND's research in this area grew out of its logistics work. For this reason, it has tended to focus more on depot maintenance and other aspects of equipment repair and support. However, RAND has also surveyed 30 commercial firms for lessons learned in the private sector and has begun to examine A-76 data. CNA's work combines depot maintenance research with its documentation of A-76 or commercial

activities contracting experiences. CNA has performed empirical analysis and case studies to gather governmental experiences. What's interesting, then, is that RAND's commercial research and CNA's government research blend so well. Many of the lessons learned are the same.

Nancy Moore and Frank Camm presented findings from their survey of commercial suppliers. RAND looked extensively not just at private suppliers, but at suppliers who do not do extensive business with the Defense Department.

Their findings emphasize the benefits of long-term contracts, although they acknowledged that it is not always wise to enter into long-term contracts immediately. Instead, firms could use shorter-term contracts initially to determine whether this is an interfirm relationship worth fostering. They also discussed performance-based contracts (contracts with incentives for continuous improvement).

The strategic sourcing process recommended to the Air Force includes a billet scrub. Low risk candidates are left on the table.

Ellen Pint presented the paper she and Laura Baldwin wrote on vertical integration. They have summarized the transaction cost literature to identify why firms might keep functions in-house rather than outsource. This brief was related to Jon Leland's review of the Navy's method of determining the core portion of depot maintenance. He showed several ways in which the method is flawed and biased toward overstating the amount that is core.

There doesn't seem to be one answer for deciding what is core, but contractibility, information problems, and comparative advantage are often mentioned. On the more practical level, you can ask what functions would survive a 50-percent budget cut.

Ed Keating presented his work on the Air Force's commercial activities experiences. He focused on the cancellation rate and the time to complete studies. The Air Force experience is very similar to that of the Navy.

Carla Tighe reviewed Navy CA experiences and discussed how CNA estimated that \$3 billion in savings would be possible if the Navy were willing and able to compete all commercial activities. She then showed ongoing research into the TA-4 contract for intermediate maintenance. The work documents improved performance and efficiency associated with contractor performance. This unique database showed that readiness remained high and costs remained down years after the initial contract.

In his brief on DoD's A-76 experience, Derek Trunkey showed that competition has had large savings (30 percent) on *average*. However, in many cases, the competitions were canceled or produced no savings.

Mary Chenoweth and Ken Reynolds showed examples of very successful contracts for DLRs. However, the use of new contract types is not nearly as common as it should be. The brief by Ed Keating gives one methodology for deciding on the right contract type.

Al Robert showed that the impact on workers during the past outsourcing initiatives has been minimal. However, many in the group voiced concern that under new initiatives the problems would be greater because of a tighter job market.

Glenn Ackerman discussed the problems with the current Navy housing. He made a strong case that sailors would be better off if the Navy increased the housing allowance (and distributed it more equitably) and did not build and maintain Navy-owned housing.

## Conclusions and implications for future research

CNA and RAND agree in many areas:

- Good contracting makes almost anything possible (and vice versa).
- How contracts are written is very important.
- Bundling is important.

- Outsourcing has been used effectively in both the public and private sector.
- Management and oversight of both internal and external providers must be improved. Improving management does not mean spending more resources on oversight.
- Headquarters needs to help regional and local commands in setting up competitions and drawing on lessons learned.
- Incentives are lacking.
- Current service contracting standards and practices in DoD are up to the challenge.

We agreed on the value of the competition and inventory databases. We were all concerned that DoD would no longer collect the individual services' data. We will pursue the idea of maintaining the database at CNA and RAND so that the data are available for future research.

RAND has devoted more resources than CNA to outsourcing in the private sector and extrapolating those results to the public sector. CNA's research has focused more on public sector competitions and the lessons learned there. There may be some differences in how strongly we believe that the private sector findings can be applied to the public sector. We agree that there are merits in looking at the private sector results and to identifying lessons learned. But savings in private outsourcing are lower because private firms are already competitive and containing costs. The need to introduce competition is more important in the public sector, which is more prone to inefficiencies. CNA believes that there is a need to regularly compete internal and external provision of services.

RAND focused more on improving headquarter's control of the process; CNA focused more on improving regional and local control of the process. Again, there was significant overlap, but also differences in emphasis.

CNA and RAND need to appreciate differences in their thoughts on lengths of contracts. We agree that the length is important, and an argument can be made for both short- and long-term contracts.

RAND thinks in terms of services that require a heavy capital investment. In these cases, longer contracts are warranted.

We agreed that research is needed in the following areas:

- We need to know more about recompetitions. We have some data and the results of some interviews, but the evidence is not nearly as strong as for the initial competitions.
- We must learn to cut the time it takes to carry out competitions.
- We need to look more at comparative performance. We have some data on depot maintenance, intermediate maintenance, municipalities, and anecdotal evidence. We need more.
- We need to look at governmental billets. A large percentage of billets are protected from competition by arbitrary classification as inherently governmental.
- We need to take a closer look at what generated savings. For example, are there savings in material and equipment?

## Session three: Logistics/readiness

In the last session, we concentrated on more direct methods of describing and improving material management. We also looked at measuring and understanding readiness including the link between logistics support and readiness. We heard five briefings on the third day:

- *Velocity Management in the Army*, by John Dumond (RAND)
- *Lean Logistics in the Air Force*, by Hy Shulman and Ray Pyles (RAND)
- *Lean Logistics: High-Velocity Logistics Infrastructure and the C-5 Galaxy*, by Tim Ramey (RAND)
- *Identifying Opportunities To Improve Material Management*, by Anne Hale (CNA)
- *Improving the Management of Readiness*, by Laura Junor and Jim Jondrow (CNA).

### Summary of session three

John Dummond reviewed a process improvement approach to achieving a more effective and affordable logistics system. He and his team have tried to make the system more robust to uncertainty in demands. They have tried to reduce the cycle times for all components of the process. They do not believe that a just-in-time (JIT) approach is appropriate. They have also tried to eliminate non-value-adding components from the process. They recommend changing the performance measure from just average time to the median delivery time and the variability of delivery time.

In their efforts to improve the process, they followed these steps:

- Define the process. Do a walk-through for each component so that the process is fully understood.
- Measure process performance.
- Improve the process by establishing goals.
- Iterate the process.

They are also working with the Marine Corps. The Marines call the process Precision Logistics.

Hy Schulman and Ray Pyles presented a scorecard approach (green, yellow, red) for comparing alternative logistics approaches. They applied the framework to aircraft engines. They compared a spares light approach to a regional repair concept. Based on the scoring concept, the regional repair concept appears more effective.

Tim Ramey showed how the Dynametric model can be used to assess alternatives for supporting the C-5 aircraft at remote sites. C-5s are needed in many remote sites, but there are very few aircraft at any one site at a given time. By rapidly moving parts to these remote sites and immediate installing them in the aircraft, the government can greatly reduce the number of parts it must maintain in regional storage facilities. This results in a more effective system.

Anne Hale discussed the issue of reducing the overall logistics response time (LRT) to improve logistics support. Performance measures recommended for measuring LRT include the mean and the 75th percentile.

The framework for applying the methodology to new technologies and concepts includes:

- Baselinining the current process
- Measuring the process using the new measures of effectiveness (MOEs)
- Identifying areas for improvement

- Identifying useful technologies and concepts
- Estimating the changes in MOEs that these technologies and concepts may bring about
- Estimating the potential benefits and risks to readiness associated with the changes.

One strength of the project is its focus on the risks associated with adjusting sparing policies to the levels suggested by the new MOEs and not achieving those MOEs.

Laura Junor addressed the Navy's concern with readiness as it draws down its forces. The Navy has asked CNA analysts to identify trends and develop predictors. They have used percent of time that ships and aircraft squadrons are in a C1/C2 status with indicators to show whether it is personnel, equipment, supply, or training that prevents the ships or squadrons from being in the C1/C2 category. They have also developed a statistical index, which is a composite of several personnel measures, that the Navy can use to reliably measure personnel readiness.

The analysts recommend using data with a substantial track record to build a benchmark database for making future comparisons. She believes the indices should be consolidated to provide a big picture view to management. Finally, they recommend that the Navy track and protect key readiness drivers such as personnel quality.

## **Conclusions and implications for future research**

This session focused on ways to improve and evaluate the logistics process and management of readiness. RAND has focused its research on increasing velocity of parts through the system. CNA's work supports RAND's focus, but also addresses the risks associated with failing to maintain the velocity.

We agreed that a complex systems approach is required to evaluate the logistics process. Logistics systems are complicated, and CNA and RAND need to help our clients with process reengineering. We also need to examine barriers to making more and better use of the civilian market.

We agreed that using averages distorts the analysis. For example, examining means of failures, delivery times, and repair could lead to inappropriate conclusions. The distributions of the individual processes must be examined.

We agreed that in the future, we should look at more than the flow of parts. We should look at the financial side. What are the incentives to contain costs and inventories and to move parts faster through the system? Whose responsibility is it to ship products? When do people get paid and what does that mean when there is a revolving fund and no constraint on how deeply one can dip into it? Also, the supplying agency may be a monopolist, and there may be simply no incentives in the system.

We discussed the concern that the lack of cost and performance visibility is a symptom not a cause. That is, the information systems reflect the needs of management, and management is simply not asking the right questions. This returns us to the issues of the first day: the need for incentives, full budgets, and choices. If the right process is in place, the right questions will be asked.

## Vision and implementation

The conference did not focus on developing a vision for improving efficiency (including outsourcing). Yet, the group, as noted earlier, agreed on many principles.

Taken together, the findings from all of the briefings point to many opportunities for improving current practices. For example, recent work looking at the A-76 competitions conducted between 1978 and 1992 found average savings of about 30 percent. About half the competitions were won by the in-house team.

This suggests that the savings come from the competition rather than from outsourcing per se. Stated another way, the in-house team was not performing support functions as efficiently as it could have. We are not pointing fingers at DoD workers; it is the system and not the workers that is at fault.

How can DoD, and the Navy specifically, capture these savings? Most options fall into these categories:

- Expanding outsourcing and competition (e.g., more A-76, getting out of certain businesses, greater use of warranties)
- Reengineering specific components of the support structure, such as material management
- Improving visibility of costs and output/quality measures (e.g., activity-based costing and better tracking of readiness)
- Changing incentives or the decision-making process (e.g., reforming DBOF and universal installation budgeting).

The best approach is to synthesize all these options. Logistics process reengineering without changing incentives, introducing better business practices, and choosing the best source won't work as well or for very long as an integrated approach.

For example, we noted that the lack of visibility may be a symptom not a cause. This points to the need for incentives, full budgets, and choices. If the right process is in place, the right questions will be asked.

Also, making the support structure efficient is a continuing process, not a one time event. Private sector businesses do not stick with the same procedure year after year; they are constantly changing and adapting. In fact, response to changing conditions may be the biggest difference between public and private provision of support. Public support activities often act similarly to private firms that lack normal competitive forces (such as monopolies). A good system will be self-adjusting to some extent, but all systems need to be maintained.

Developing good measures of performance is a crucial part of achieving efficiencies. For example, what has allowed readiness-based sparing to succeed was the general agreement that the Full Mission Capable rate was a good measure of performance. So opponents could not claim that the Navy was simply reducing the quality of its support.

## Vision statement

We propose the following as a vision statement for the support structure:

Support services should be provided in the most efficient manner possible. This will be achieved by finding the right source for support, increasing visibility of cost and performance measures, giving managers more authority and better tools, incorporating better incentives into the system, and managing these initiatives as an ongoing process.

## Principles

CNA believes the following principles should guide the Navy in pursuing a more efficient support structure:

- The Navy will seek the best value in selecting providers of services through outsourcing and competition.

- Everything will be put on the table.
- Competitions will be conducted as fairly and as rapidly as possible.
- Activities will be bundled in a way that encourages many bidders. Don't use 10 small competitions when one big one will work better.
- Claimants and installations will have dollar targets. We recommend this instead of "you will compete four refuse collectors at Podunk, Missouri." This avoids such arguments as "we don't really have four collectors," and you can never get at the "inherently governmental" billets. If you give dollar targets and say "I don't care how you get there," you are more likely to succeed. Recognize that local and regional differences could lead to different bundling and competition practices.
- Public workers will be treated fairly and equitably.
- Resources will be provided for studies. Central authorities will provide the skills and tools necessary to make accurate comparisons between public and private alternatives.
- The Navy will provide tools and guidance.
  - Automate the process
  - Don't start from scratch each time
- Functional specialists (PWS writers) will be integrated early.
- The Navy will use best practices contracting both long- and short-term contracts have uses: Longer term contracts may make sense when firms are asked to make substantial Navy-unique investments in skills or capital.
- Changing the RFP to make it less unique. You can use a shorter contract (e.g., put the building at the edge of the base or in town so it has some alternative use). Use commercial standards and practices. The Navy has successfully competed even with a cumbersome process—the goal here

is to reduce the number of competitions with zero savings and incomplete studies.

- The process will not end once the initial competition is over. Whether competitions are won in-house or outside performance and costs will be monitored, and the activity will be subject to recompetition.
- Visibility will be increased.
  - There will be cost visibility at both local levels and higher commands. (better accounting)
  - More and better measures of performance will be put in place.
    - Quality (e.g., readiness links)
  - Data collection will improve. The collection of data in past A-76 competitions was lacking in many ways, and now DoD takes no responsibility for collecting data on new A-76 initiatives.
- Managers will have more power and authority.
  - Choice of performer
  - Provide visibility on costs and performance
- Managers and employees will be given better incentives.
  - Savings (from outsourcing, unified budgets, and gain sharing) will be shared.
  - Promotion will be based on efficient management.
- Senior leaders will maintain progress and keep the process moving without micro-managing.

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